ness, and dolichocephaly is not observed among the European Jews, but they have other physical traits of their non-Jewish neighbours.

Prof. F. von Luschan believes that the blond Jews of antiquity may have been the result of intermarriage with the fair "Amorites," but the bulk of the blondness, according to Fishberg, must have been acquired later by intermarriage with non-Jews. He also shows that the predominant type of Jewish nose is straight, nearly 60 per cent., the aquiline being only about 14 per cent. The character of the nostrils, to which Joseph Jacobs directed attention, is characteristic only of the latter type of nose, which von Luschan says should be termed Armenoid and not Jewish or Semitic. It is very commonly asserted that owing to social and religious causes the Jews have retained their "racial purity." Putting aside the dark Jews of India and Abyssinia, among whom proselytising has taken place, we read that in Gaul, Spain, Italy, and Hungary the Jews owned slaves, and records show that the Church has at various times taken measures to prevent them from converting their Christian slaves to their own faith; finally, the Church was compelled to forbid them to own slaves altogether. The descendants of white slaves have been fused with the rest of the Jews, and to-day, after several generations of liberty, they can be no longer recognised; but other causes have contributed to miscegenation. Fishberg supports the statement of Gumplowitcz that "the type or physiognomical character of a folk or social group is not anthropological but social"; he adds, "Mainly for this reason most of the Jews in eastern Europe, who are anthropologically of various types, deceive the casual observer into believing that they all present physiognomical homogeneity."

These conclusions, which he believes to be justified, dissipate the exalted notion of the "Chosen People," who claim that they can trace back their ancestry to their patriarch and progenitor Abraham, as well as the pseudo-scientific theory of the Anti-Semites of a "Jewish race," which is entirely alien in Europe, and incapable of assimilating European standards of morals and fair play. From all the historical evidence available, it appears that the Synagogue and the Church are both powerless to prevent intermarriage between Jews and Christians unless the State comes to their rescue. Such marriages are increasingly taking place; thus there is every indication that the social isolation of the Jew is coming to an end, and that in the near future all the real and alleged differences between Jews and Christians will completely disappear in progressive communities.

The author gives interesting information concerning the marriage-rate, birth-rate, and infant mortality among the Jews, and their pathological characteristics are discussed at length. There are practically no differences between Jews and Christians as regards the incidence of typhoid fever, scarlet fever, measles, diphtheria, &c. The so-called "tenacity of life" of the Jews is mainly dependent upon the great care Jewish mothers take of their children; they nearly always nurse them at the breast, and Jewesses only rarely go to work in factories after marriage. Their lesser liability to consumption is remarkable, perhaps because, being better adapted to city life and overcrowding by a long sojourn in the Ghetto, and by a process of natural selection, there were eliminated most of those who were predisposed to tuberculosis. The only pathological processes which are more frequent among Jews are the derangements of the nervous system.

"The Jew is the most nervous, and, in so far, the most modern of men. He is by the very nature of his diseases the forerunner, as it were, of his contemporaries, preceding them on that perilous path upon which society is urged by the excesses of its intellectual and emotional life, and by the increasing spur of competition."

Many other aspects of Jewish life are dealt with in this interesting and valuable study, such as the social, economic, and political conditions of the Jews. With regard to their future as a people—for we are no longer justified in speaking of a Jewish race—the author evidently subscribes to Ruppin's statement that "orthodoxy and poverty, assimilation and prosperity, are almost synonymous terms with the Jews."

A. C. HADDON.

ALCOHOLIC FERMENTATION.

Alcoholic Fermentation. By Dr. A. Harden, F.R.S. Pp. ix+128. (London: Longmans, Green, and Co., 1911.) Price 4*s.* net.

THE appearance of Dr. Harden's "Alcoholic Fermentation" will be warmly welcomed by those engaged in studying problems connected with yeast and the production of alcohol. Dr. Harden's own contributions to the question of alcoholic fermentation are so well known that one expects and finds in this small volume a good up-to-date general survey of the subject. The material is divided up into eight chapters, of which the first is devoted to historical introduction, whilst the next four deal with the properties of zymase and the theories which have been developed since Buchner's fundamental discovery of the dependence of fermentation on enzymes rather than on necessarily living organisms.

In dealing with the accelerating effects of phosphates, arsenates, and arsenites on the course of fermentation, Dr. Harden compares the ideas of von Lebedew and Iwanoff with his own conception of the constitution and function of the "hexosephosphate," which he formulates as the salt of a hexose-diphosphoric acid, whilst Iwanoff regards the substance as a triose-phosphoric acid, $C_3H_5O_2(PO_4H_2)$. Perhaps the strongest evidence in favour of the hexose-diphosphoric acid formula is afforded by the observation of Harden and Young, that when hydrolysed, fructose, as well as phosphoric acid is produced. The significance of the phosphate derivatives is such that one must welcome the synthetic production of phosphoric ester-acids of sugars and allied compounds now being effected by Contardi and Neuberg.

Some interest attaches to Neuberg and Pollak's synthesis of salts of monophosphoric acids of sucrose and glucose, as they have been isolated in analysable condition. and, though not of glucoside type, need to be hydrolysed before undergoing fermentation with yeast. In the case of the hexose-phosphate of alco-

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holic fermentation, probably the aldehyde-group participates in the formation of the ester-acid. Dr. Harden remarks (p. 46),

> "the identity of the products from glucose, mannose, and fructose may be explained by regarding the acid as a derivative of the enolic form common to these three sugars, or *by supposing that portions of two sugar molecules may be concerned in its production.*"

The "equation of alcoholic fermentation,"

$$2C_6H_{12}O_6 + 2PO_4HR_2 = 2CO_2 + 2C_2H_6O + 2H_2O + C_6H_{10}O_4(PO_4R_2)_2,$$

whilst recording the experimental facts, scarcely affords an explanation of the formation of alcohol, as it is not obvious why, when one of two glucose molecules forms hexose-phosphate, the other should yield carbon dioxide and ethyl alcohol. Perhaps the part of the above quotation which the reviewer has put in italics furnishes a clue.

Chapter iv., dealing with Harden and Young's discovery of the coenzyme of yeast-juice and its remarkable properties, is of considerable interest, and the possibility of this containing the phosphate group referred to, though it is admitted that experiments have so far yielded only negative results. The next chapter is devoted to the action of inhibiting and accelerating agents on the enzymes of yeast-juice, whilst in chapter vi. the by-products of alcoholic fermentation are dealt with. The results of F. Ehrlich's brilliant work on the production of higher alcohols are clearly expounded, and production of aldehydes and glycerol referred to. It is a matter of interest that only living yeast appears to be capable of producing alcohols from the amino-acids, and even then only does so in presence of fermentable sugar. The discovery of zymase has furthered the solution of the fermentation problem, but the stability of the amino-acids in the absence of the living organism, and the superiority of yeast itself over preparations of its enzymes in effecting the conversion of hexoses into alcohol and carbon dioxide need further explanation.

The chemical changes involved in fermentation are dealt with in chapter vii., and the various explanations put forward at different times are recorded; the reader cannot fail to be struck with the small measure of success which has so far attended these efforts.

Chapter viii., on the "Mechanism of Fermentation," is rather condensed in comparison with the rest of the work; here, however, one departs somewhat from the biochemical aspect of the problem which has been treated by Dr. Harden in so successful a manner.

J. T. H.

A CRITIC IN GEOLOGY.

L'Évolution des Théories géologiques. By Prof. S. Meunier. Pp. 366. (Paris: F. Alcan, 1911.) Price 3.50 francs.

THIS is one of the most useful works that Prof. Stanislas Meunier has given to his geological colleagues, and at the same time it will be appreciated by the general reader. The latter, however, must be constantly on his guard, lest he cry out, "A hit, a very palpable hit," every time that Prof. Meunier tilts against the theories of to-day. In an introduction intended to show the inexactitude of the works of nature when compared with the demands of mathematics, the author seems to include in the same order of things the forms of basalt columns and those of crystallised minerals; he rightly points out the irregularity of the former, but says of man (p. 12),

> "à la place des formes toujours variées des objets naturels, il a inventé les formes géométriques . . . tetraèdre, cube, rhomboèdre . . . auxquels il rapporte les objets véritables."

Prof. Meunier doubts the conclusions of the chemist when he remarks, "De même, à la place des composés naturels, il à inventé des composés définis; oxydes, acides, sels," &c. All this is harmless Meunierism to the trained geologist, and will be taken in good part, like the author's rejection of the reality of the Ice age; and it is undoubtedly good for us to have the erroneous conclusions arrived at in the past by the "unanimity of geologists" pointed out as a warning for our later age.

The history of geological thought exhibits to us a science more cumbered by theory in its earlier stages than it is at the present day, and Prof. Meunier does well to begin with cosmogony, tracing the study from Moses to Sir George Darwin. The form of the earth and the nature of its interior are then discussed, with references in the main to French authors. But in succeeding chapters the literature of the world is freely drawn on, and is often criticised as freely. The chapter on mountain building is of special interest, though a more regular chronological arrangement would have aided the reader. The author hails with complete approval the views of Suess on horsts, and of Schardt and Termier on horizontal overfolds, and justice is done (p. 99) to Reyer's theory of gravitational sliding.

The chapter on earthquakes is still more injured by lack of systematic arrangement, and cannot be regarded as complete. In that on metamorphic theories we should have liked to find the names of Scrope and Darwin, both of whom had such clear views on foliated rocks; but Hutton, Lossen, Lehmann, and Michel Lévy are similarly passed over, and the chapter is a brief essay rather than a history. Rivers and glaciers are more adequately dealt with. The chapter on the latter concludes (p. 282) with the following amazing statement as to the striated pebbles found in boulder clays:—

> "Or il est maintenant démontré que les stries . . . ne sont aucunement d'origine glaciaire et qu'elles dérivent entièrement du phénomène d'érosion réalisé dans la masse des éboulis par l'infiltration des eaux de pluie."

Has Prof. Meunier ever consulted an agriculturist as to the penetration of boulder-clay by rain, or has he seen the scratched blocks in a modern glacial deposit, newly revealed from Arctic ice? He continues the discussion when dealing with "théories sédimentaires," and asserts firmly (p. 301) that "pratiquement les glaciers ne strient pas de galets." French tourist steamers now penetrate the fjords of Spitsbergen, and Prof. Meunier should certainly ask one of these to land

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